Operating instruction

Number of instruction:
LMI-01-01/10/11/USA

Moisture analyzer
PMC series

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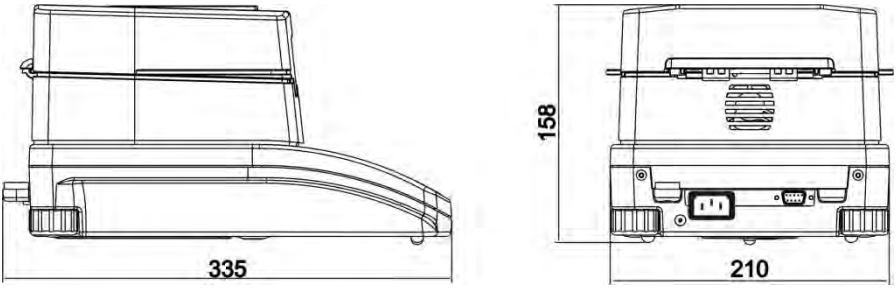
1. TECHNICAL PARAMETERS

Type	PMC 50/1	PMC 50	PMC 110	PMC 210
Max capacity	50 g	50 g	110 g	210 g
Reading unit	0,1 mg	1 mg	1 mg	1 mg
Tare range	- 50 g	- 50 g	- 110 g	- 210 g
Max mass of sample	50 g	50 g	110 g	210 g
Accuracy of moisture reading	0,0001%	0,001 %		
Repeatability of moisture	+/-0,24% (sample do 2g), +/-0,06% (sample 2-10g), +/-0,04% (sample over 10g)			
Drying temperature range	max. 160 °C (halogen, IR emiter) max. 250 °C (halogen)			
Hitting module	Halogen IR emiter			
Drying modes	4 profils : standard, quick, step, mild			
Auto switch off options	automatic, time defined, manual			
Working temperature	+10 °C - +40 °C			
Power supply	110V 50Hz AC / 400W			
Display	LCD (backlit)			
Pan size	Φ 90 mm, h = 8 mm			
Drying chaber dimensions	120 x 120 x 20 mm			
Net Wright/gross weight	5,1 / 7,2 kg			
Packaging size	455 x 315 x 302 mm			

Dimensions:



2. BASIC INFORMATION

CAUTION!
Utilization of PMC moisture analyzer conversely to safety provisions and user manual may be hazardous to health and life. Never use the moisture analyzer is explosive area. Moisture analyzer is not prepared to use in areas with danger of explosion. The interior part of drying chamber may heat up to 400 °C. nominal power supply of moisture analyzer is from 110 tu 230 V, thus it is necessary to use the device according to safety principles. The symbol visible on the top of the moisture analyzer cover (as presented below) is a warning against hot surface.

2.1. Balance appropriation

Moisture analyzer is a device used for determination of relative humidity of small samples of various materials, determination of dry mass in small samples of various materials and determination of mass of weighed objects. It guarantees fast and precise determination of water content in tested sample, and through application of LCD or graphic display it provides easy use and operation. Moisture analyzer series PMC can be used to determine humidity content of multiple materials.

At the initial stage of measurement, the device precisely determines the mass of object placed on its weighing pan. Following this, there is fast heating of the

sample with halogen or IR lamps. This causes evaporation of humidity from the tested sample. While sampling, the moisture analyzer is continuously checking the decline of mass, and after calculation, it displays current indications on the display of the balance.
Compared to conventional methods of humidity content determination in various materials, application of moisture analyzer series PMC significantly shortens measurement time and simplifies testing procedure. Moisture analyzer allows for setting of multiple parameters which influence testing of a sample, like temperature, time, drying profiles, etc.

2.2. Usage conditions

CAUTION!
If drying process is active do not allowed to open drying chamber. Moisture analyzer is equipped with a halogen lamp which is very powerful heat source. Thus, user should pay special attention no to touch those elements of moisture analyzer that get hot while drying procedure (disposable pan, handle of pan, and internal cover of drying chamber). Please remember, that some elements may become dangerous if heated (poisoning vapours, danger of ignition or explosion).
Moisture analyzer can not be used for dynamic weighing. Even if small masses are added to taken off from weighing pan, than weighing result should only be read if stability marker ◣◢ is displayed. Do not put magnetic materials on weighing pan of a moisture analyzer. This can defect the measuring set of the device. Do avoid dynamic loading of weighing pan, and do not exceed maximal capacity of the device. Please consider applied tare mass when calculating mass of tested object. Never use moisture analyzer in explosive area. Moisture analyzer is not designed and adjusted to operate in explosive conditions. Do not perform any modifications to the device.

2.3. Principles of safety operation

Use of PMC moisture analyzer conversely to safety principles and user manual may be hazardous to operator's health and life. It is obligatory to acknowledge with safety principles listed in user manual:

- use moisture analyzer onto to determine humidity content in samples and determination of sample mass. Any other use of moisture analyzer may be dangerous either to the device or the user,
- before switching on the moisture analyzer, make sure that the nominal power of the device specified on its data plate, is compatible with the supply in the mains to which moisture analyzer is connectable,
- **change of halogen can be carried out only in authorized service**,
- protect moisture analyzer against contacts with liquids,
- as the area around moisture analyzer gets heated, do not put any inflammable objects or substances in close distance to device,

- substance containing toxic or caustic vapour should be tested in a chamber which absorbs the vapours,
- samples of substances that produce inflammable vapours if heated should have relatively small mass, and drying process should be performed in low temperatures,
- please remember that aggressive substances may cause corrosion to the device.

2.4. Warranty

Warranty does not cover below mentioned cases:

- Not observing the regulation listed in user manual,
- Use of the moisture analyzer conversely to its application,
- Any modifications of moisture analyzer,
- Mechanical defects and defects caused by media, liquids and natural wearing off,
- Improper placing of defects of electrical network / mains,
- Overloading of measuring mechanism of the moisture analyzer.

2.5. Supervision over metrological parameters of moisture analyzer

Metrological features of the moisture analyzer should be checked by the user in set period of time. This period depends on environmental factors of moisture analyzer's location, kinds of performed processes and quality system introduced byte user.

2.6. Data in user manual

Read the user manual carefully before switching on the device, even if the user is experienced with this kind of devices.

2.7. Operation competence

Moisture analyzer should only be operated and supervised by trained personnel with experience in usage of this kind of devices.

3. TRANSORT AND STORAGE

3.1. Delivery check

Please check delivered package and device immediately after receipt and evaluate whether its free from any external defects.

3.2. Packaging

Please keep on stock all the elements of the packaging, in case future transport of a moisture analyzer is needed. Only the original packaging of the moisture analyzer is suitable for transportation purposes. Before packing, please unplug the device from mains, and take out all moveable parts (pan, covers, etc.). parts of moisture analyzer should be put into original packaging, so that they are protected while transport.

4. UNPACKING, INSTALLATION AND DEVICE CHECKING

4.1. Place of installation, place of use

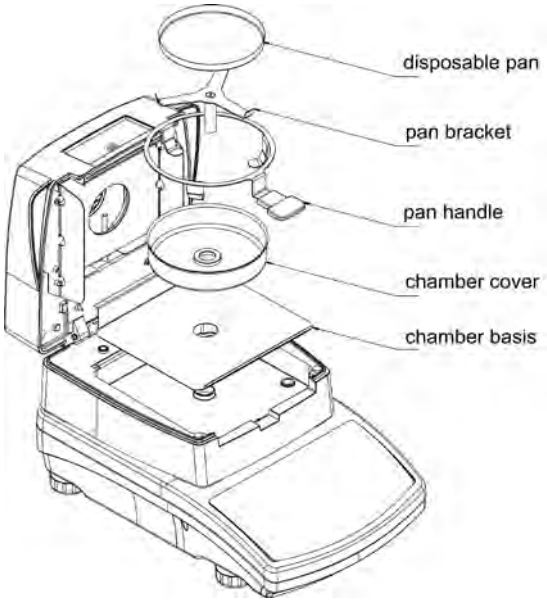
- Moisture analyzer should be stored and used in places free from vibration and shakes, free of wind and breeze, dust free and not higher than 2000 meters above sea level,
- Operation place should be situated in place with good air circulation, especially around the device (20 cm around the moisture analyzer, and 1 meter from top of the device).
- Room temperature should equal:
  $+10\ ^{\circ}C \div +40\ ^{\circ}C$,
- Relative humidity of operation room should not exceed 80% in $31^{\circ}C$, and decrease linearly to 50% of in $40^{\circ}C$,
- Moisture analyzer should be placed on a wall console or a stable table, free of vibration and shakes , and distant from heat sources,
- Special attention should be paid to weighing magnetic materials, as balance is equipped with a strong magnet.

4.2. Unpacking

Gently take the moisture analyzer from package, take off plastic, cartoon and foil transport protections, and gently put the device in previously prepared

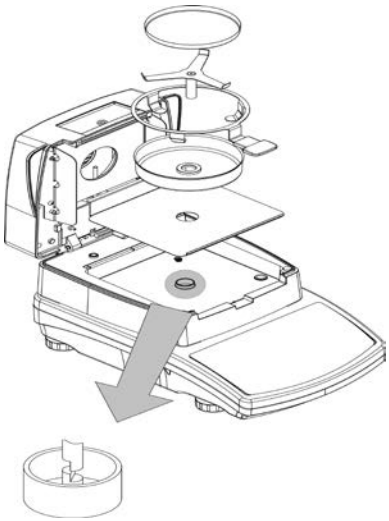
operation place. Install components of moisture analyzer according to below schema:

Montage schema for parts of moisture analyzer:



- Install cover of drying chamber,
- Install weighing pan handle,
- Install pan supporter,
- Put disposable weighing pan in prepared place.

Setting pan supporter:

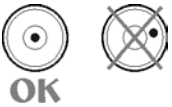


When installing weighing pan supporter, pay special attention to positioning of the weighing pan mandrel cross. The mandrel is equipped with special cut for unique positioning of the handle towards the cross, which eliminates their contact and friction. Positioning of weighing pan cross:

- After placing the weighing pan cross on the mandrel, turn the cross slightly, so that the cutting on the mandrels are situation in correct position,
- When turning the mandrel, use most gentle movements so that mechanism of the moisture analyzer is not damaged

4.3. Setting

Before switching on the device, please level the moisture analyzer using the feet situated at the back of its casing. The bubble of the level should be situation in the centre of the ring.



4.4. List of standard elements of the delivery

- Moisture analyzer.
- Insert for base of the drying chamber.
- Drying chamber cover.
- Pan holder.
- Cross.
- Disposable pan.
- Power cable.
- User manual.

4.5. Cleaning of moisture analyzer

Moisture analyzer should be cleaned with use of a damp cloth. Gently rub dirty places. Weighing pan must be removed from the moisture analyzer for cleaning. **Cleaning weighing pan when it is installed may cause damage of moisture analyzer mechanism. Remember about disconnecting the moisture analyzer from power supply before the cleaning.**

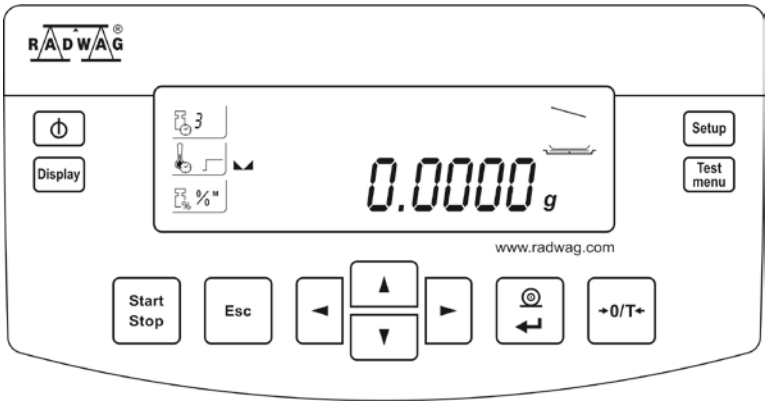
4.6. Connecting to mains

Moisture analyzer can be connected to mains only by means of original supply wire which is basic equipment of balance. Rated voltage (given on data plate) should be consistent with mains rated voltage.
Supply wire can be connected only to socket with ground contact. Switch on supply of moisture analyzer – plug of supply wire should be connected to the socket on the back of analyzer casing.
Display of moisture analyzer will indicate name and number of program, next display will indicate 0.000 g (for balances with accuracy of 1 mg) or 0.0000 g (for balances with accuracy of 0,1 mg). If indication is different from zero, press **TARE** key.

4.7. Connection of additional equipment

Before connection of additional equipment or its change (printer, computer PC), disconnect the moisture analyzer from power supply. Only additional equipment which is recommended by the manufacturer of moisture analyzer can be connected to it. After connecting the devices, plug in the moisture analyzer to power supply.

5. KEYBOARD OF MOISTURE ANALYZER



Start Stop	**Start/Stop** key – switch on/ off process of drying according to chosen program.
Esc	**Esc** key, resignation from introduced changes / exit to one level higher in menu.
◄ ▲ ▼ ►	Group of navigation keys – change of parameters value; moving in menu.
↵	**Print/Enter** key – sending display state to external device (Print) or confirmation of chosen value or function (Enter).
→0/T←	**TARA** key – zeroing the indications.

	On/Off key – switch on/off display of moisture analyzer. After switch off the display, other subassemblies are supplied, moisture analyzer will be in standby mode
	Display key – changes type of data displayed during and after drying process.
	Setup key – enter to main menu.
	Test menu key – starting choice of drying modes.

6. STARTING THE OPERATION

After disconnection from mains, moisture analyzer will carry out the display test (All display marks will be indicated), display name and number of program and move to weighing function.

6.1. Temperature stabilization time of moisture analyzer

Before measurements, wait until moisture analyzer reaches temperature stabilization. It is time of self-heating. For moisture analyzers which before switch on were stored in much lower temperature (e.g. during winter), time of adjustment and heating is together about 4 hours. During temperature stabilization, display indication might change. Appropriate operation of moisture analyzer is possible in temperature range given in technical parameters in point 1. Moisture analyzer should be used in place with small (slow) changes of ambient temperature.

7. USER MENU

User menu is divided into 5 basic function groups.

7.1. Moving in user menu

User moves in menu by means of analyzer keyboard:

	Enter to main menu
	Navigation key – choice of parameters group upwards menu / change of parameter value one value up. Key **Up**.
	Navigation key – choice of parameters group downwards menu / change of parameter value one value down. Key **Down**.
	Navigation key – choice of parameters group, which is to be activated. After pressing the key, display will indicate first parameter from chosen group. Key **Right**.
	Navigation key – exit one level higher, e.g. to main menu. Key **Left**.
	Resignation from the change of the parameter. Key **Esc**.
	Approval / acceptation of introduced changes. Key **Print/Enter**.

Names of functions groups and their contents are shown below:

P1 CAL [Calibration]

P1-01 ECAL		[external calibration]
P1-02 tCAL		[calibration test]
P1-03 tE_CAL		[calibration of drying chamber]
P1-04 CALr		[report from calibration]

P2 GLP [Good Laboratory Practice]

P2-01 USr		_	[name of user]
P2-02 PrJ		_	[name of project]
P2-03 Ptin		YES/no	[printout of measurement time]
P2-04 PdAt		YES/no	[printout of measurement date]
P2-05 PUSr		YES/no	[printout of user name]
P2-06 PPrJ		YES/no	[printout of project name]
P2-07 PId		YES/no	[printout of factory number of balance]
P2-08 PFr		YES/no	[printout of frames]

P3 tinnE [Date / Time]

P3-01 StinnE		[time setting]
P3-02 SdAtE		[date setting]

P4 rEAd [Main user parameters]

P4-01 AuE	Stand/SLouu/Fast		[filtering level]
P4-02 Auto		On/OFF	[autozero]

P5 Print [Date transmission – RS 232]

P5-01 bAud	2400/4800/9600/19200	[speed transmission]
P5-02 PStb	YES/no	[result printout: stable or unstable]
P5-03 LinE_t	1/2/3/5/10/20/30/60/120/180	[printout time]

P6 othEr [Other functions]

P6-01 Libr		YES/no	[program library]
P6-02 bL		YES/no	[backlight]
P6-03 bEEP		YES/no	[beep]
P6-04 PrnS			[parameters printout]

7.2. Back to weighing function

CAUTION
Introduced changes in memory of moisture analyzer will be saved after return to weighing with application of saving changes procedure.

Press few times key **Esc**, until display indicates **SAuE ?**

After indication, press:

- **Print/Enter** - changes confirmation
- **Esc** - resignation from introduced changes.

8. WEIGHING

Before measurements or in case of significant external conditions changes (e.g. big changes of ambient temperature) moisture analyzer should be calibrated. Procedure of calibration is described in further part of instruction.

- before measurements load the pan few times with load close to max capacity,
- after unload, check if unloaded moisture analyzer indicates zero and if measurement is stable - symbol ◣◢, if not press key **TARA**,

- place on the pan of moisture analyzer weighed load and when indications are stable, read out the weighing result from the display,
- mass indication of placed on pan can be tarred many times by pressing **TARA** key (sum of tares mass introduced to memory of moisture analyzer can not exceed its max capacity).

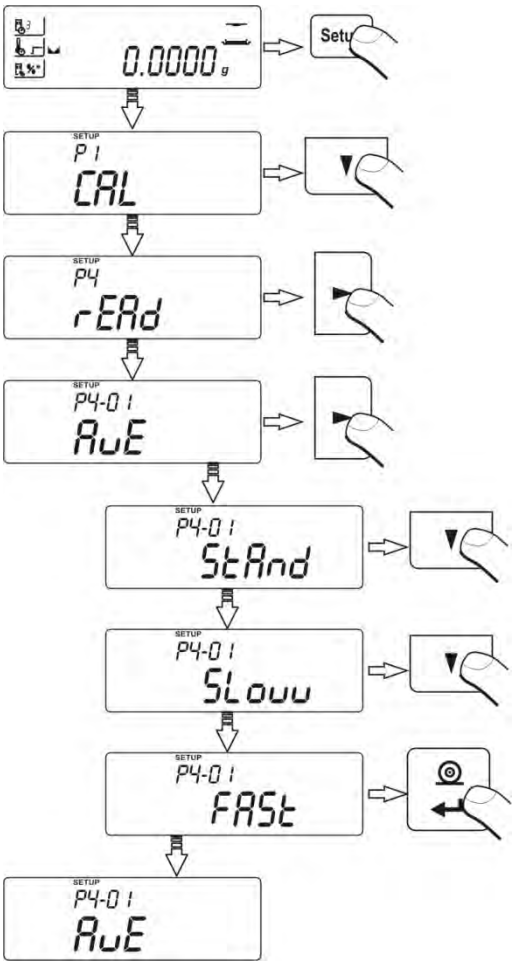
During break between measurements series, do not disconnect the balance from mains. It is advised to switch off only the display with **On/Off** key. After pressing **On/Off** key**,** moisture analyzer is ready to operate.

9. MAIN PARAMETERS OF MOISTURE ANALYZER. ADJUSTMENT OF MOISTURE ANALYZER TO CONDITIONS IN OPERATION PLACE

- Setting filter mode – **AuE**.
- Autozero function – **Auto**.
- Access to library of drying programs – **Libr**.
- Weighing result backlit - **bl**.
- Signal „beep” – reaction to pressing the key – **bEEP**.

User can adjust the balance to external environmental conditions (change of Digital filters), or to one’s need (autozero operations or display backlit), thanks to parameters in group of functions connected to adjustment of balance to conditions in place of use.

9.1. Filter setting



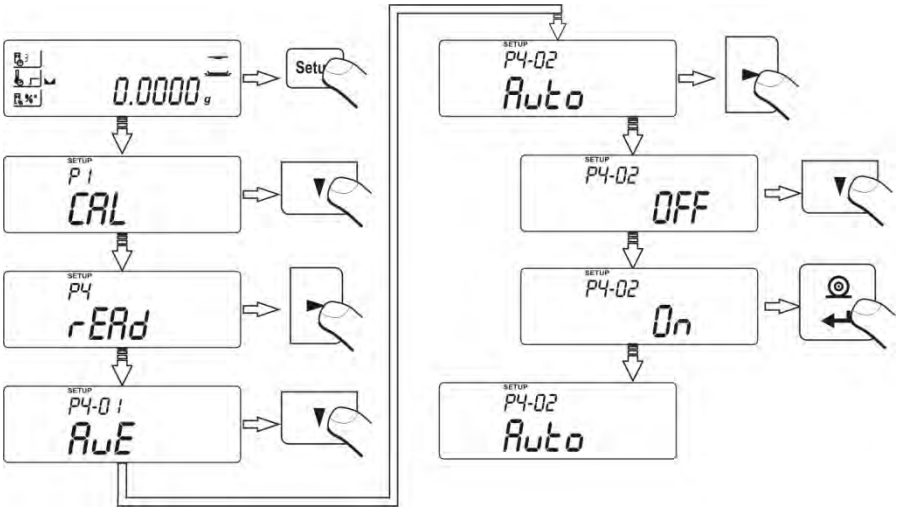
- Using navigation keys, choose value of filter which is needed,

AuE = StAnd **-** (standard) – normal operating conditions,
AuE = Slouu **-** (slow) – bad operating conditions – vibrations etc.,
AuE = Fast - (fast) – good operating conditions – without vibrations etc.

CAUTION
The higher filtering mode, the longer weighing time.

9.2. Autozero function

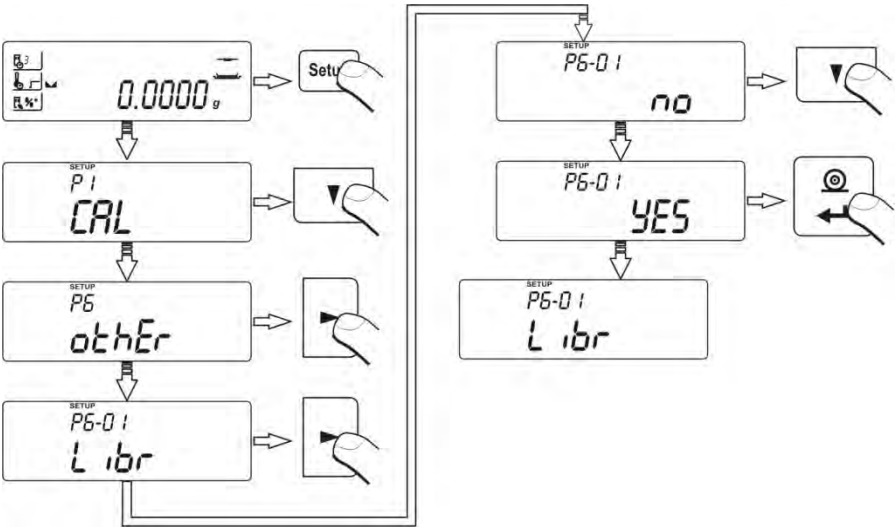
To assure accurate indications of moisture analyzer, program autozero function was introduced (**Auto)**. The task of this function is automatic control and correct of moisture analyzer zero function. When function is active, comparison of consecutive results takes place in declared time intervals e.g. every 1 s. If these results vary of value smaller than in declared range of autozero e.g. 1 division, then moisture analyzer automatically zeroes and marker of stable result is displayed – ◣◢.
When autozero function is on, then each measurement starts from precise zero. There are special cases when this function interrupts in measurements. Such example can be very slow loading the pan (e.g. exact load). In such case zero indication correction system can also correct indication of Real mass load.



Auto = On - autozero on,
Auto = OFF - autozero off.

9.3. Access to library of drying procedures

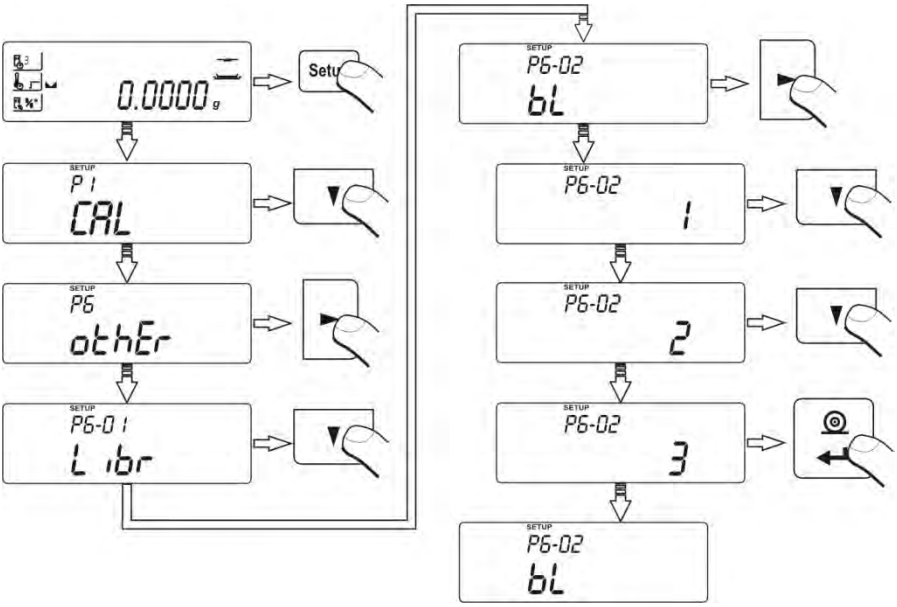
To use programs procedures library choose one of the options:



no - drying programs libraries are not accessible,
YES - drying programs libraries are accessible.

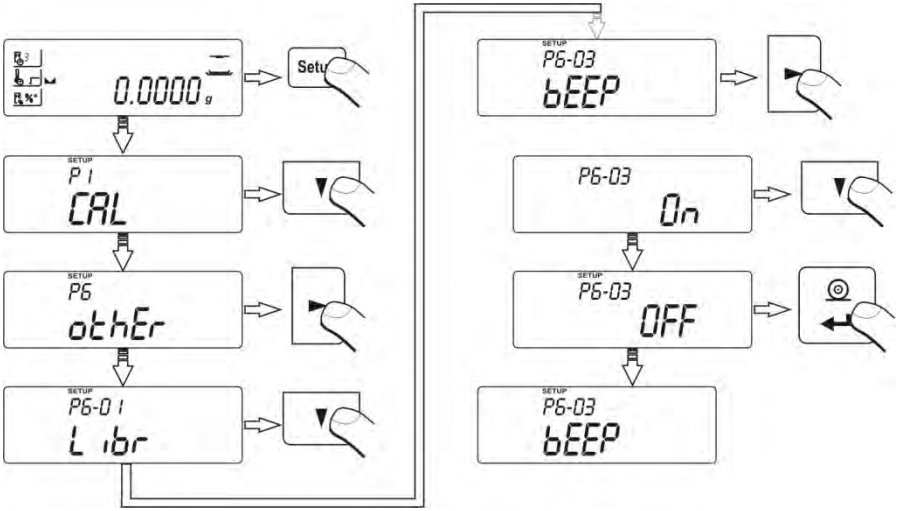
9.4. Backlit of weighing result (display screen)

Function enables to switch on or off backlit of weighing result.



bl = 1 - backlit on,
bl = 2 - backlit on permanently,
bl = 3 - backlit on temporarily.

9.5. Signal „beep” – reaction to pressing the key



bEEP = On - signal beep on,
bEEP = OFF - signal beep off.

10. CALIBRATION

Because acceleration of gravity (gravity force) changes depending on geographical location, each moisture analyzer should be adjusted to place of use.Calibration process must take place during first installation of moisture analyzer in its place of use and after each change of this place (similarly to change of ambient temperature).
To ensure high accuracy, periodic check of moisture analyzer accuracy by carrying out calibration is required.

Calibration should be carried out:

- before starting the weighing,
- when there are long breaks between consecutive measurement series.

Type of calibration:

- calibration with external calibration mass

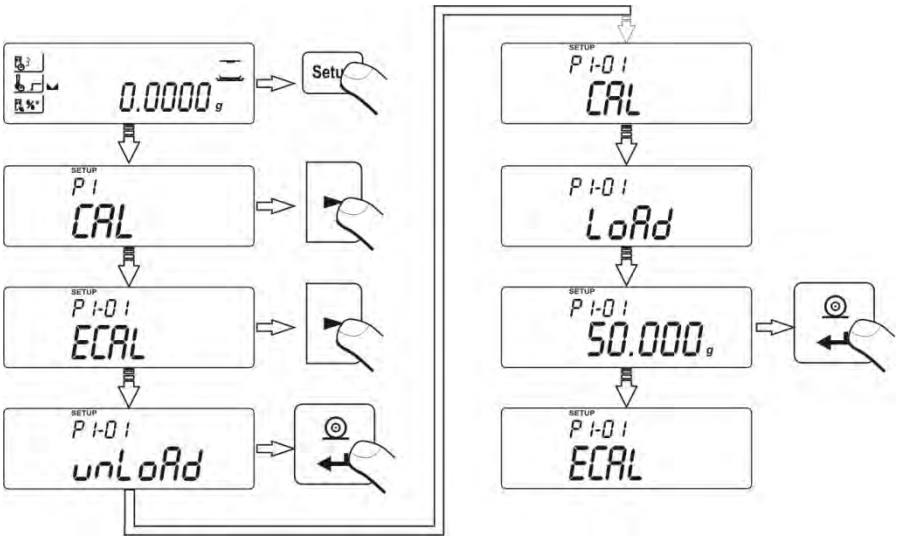
Remember to carry out the calibration when pan is unloaded!
In case when pan is overloaded, display will indicate **Er 1 Hi**.

Calibration process can be stopped when needed. To stop the calibration press **TARA**.

10.1. External calibration

External calibration should be carried out by means of calibration mass class F2 or more precise one.

Start process of external calibration,



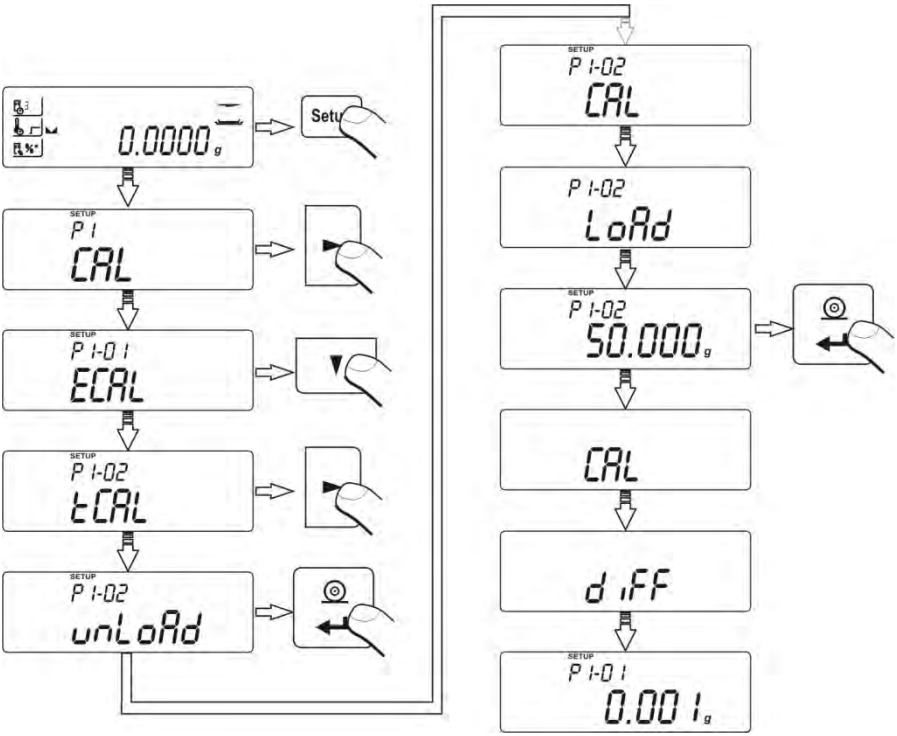
choose function **CAL**, balance will display indication **unLoAd** – unload the pan (**pan must be empty)** and press key **Print/Enter**. Display will indicate value of calibration mass which should be placed on the pan – press key **Print/Enter**. When calibration is completed, moisture analyzer will return to menu **P1-01 ECAL**.

CAUTION
*- To stop calibration process, press key **Esc**.*
- In case when pan is loaded during calibration, display will indicate **Er 1 Hi**.

Return to weighing
(according to procedure in 8.2 – return to weighing function).

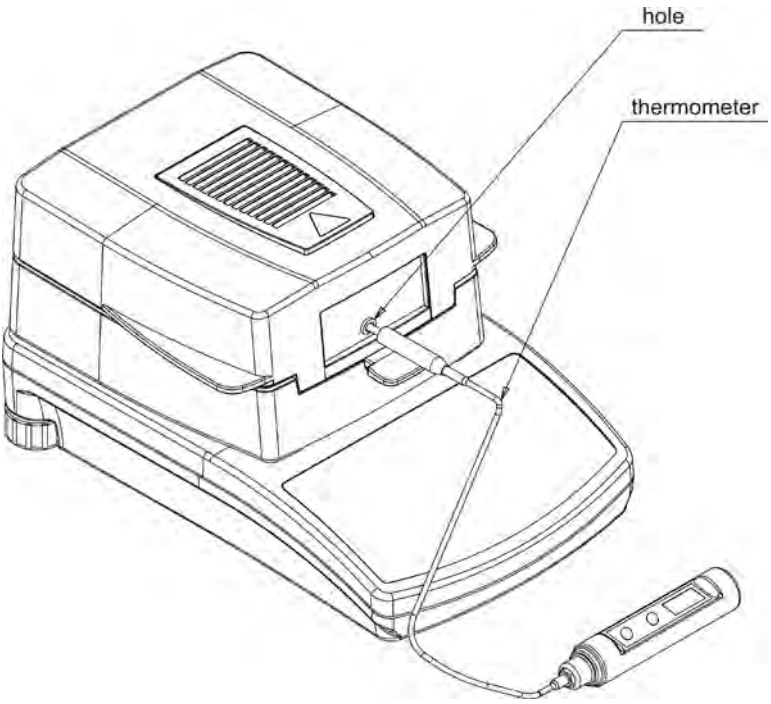
10.2. Calibration test

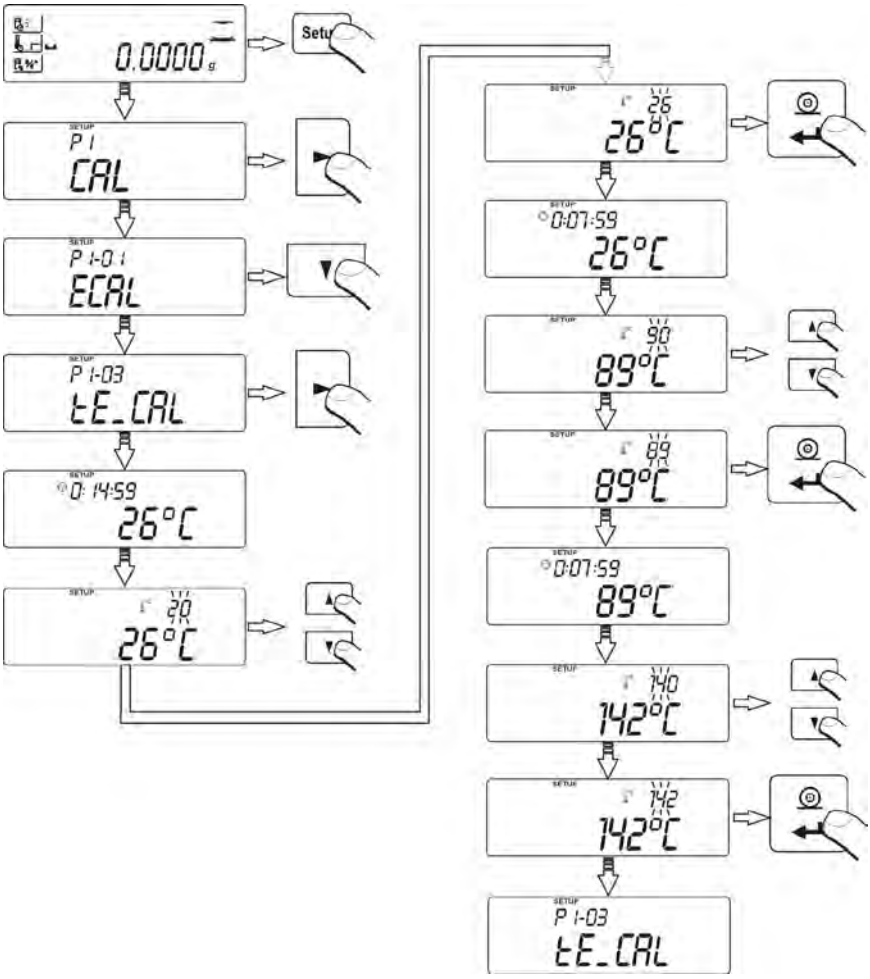
It consists in comparison of calibration mass with value of last calibration saved in balance memory. This process takes place automatically and display indicates its result (if balance is connected through RS 232 port to computer or to printer, calibration test will be printed). After pressing key **Print/Enter**, display will return to previous window.



10.3. Calibration of drying chamber

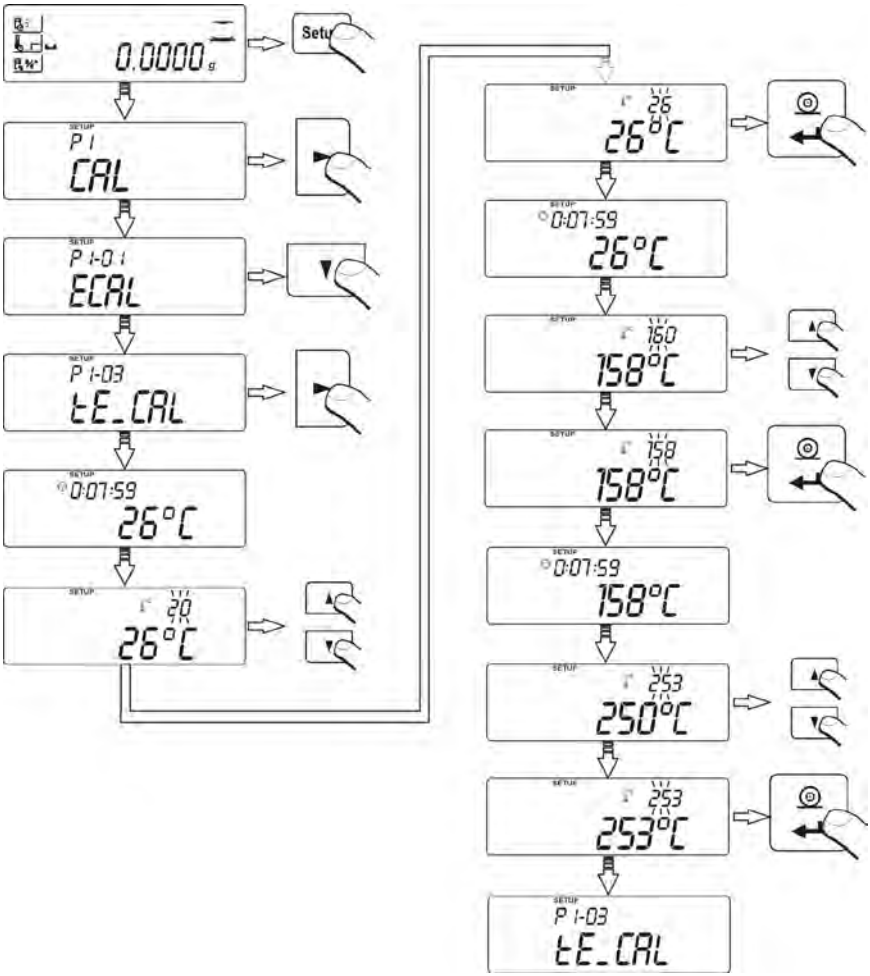
Calibration of drying chamber is a process which task is to calibrate temperature sensor of moisture analyzer. To carry out the temperature calibration of moisture analyzer, place the control thermometer in drying chamber hole as show on the picture below.





Choose menu **P1-03 tE_CAL**, calibration process will be initiatedDisplay indicates current temperature of the moisture analyzer. After 7 minutes, the display shows (blinking)
value of the temperature. Set the value corresponding to the current temperature of the moisture analyzer.
Press **Print/Enter,** to start the second phase of calibration. The moisture analyzer activates halogen lamp and heats up the drying chamber for 7 minutes, showing the current temperature. After that time, the display indicates blinking value, which should be changed according to the current temperature in the moisture analyzer.
After entering the temperature value, proceed with the last phase of calibration process, by pressing the button **Print/Enter.** The drying chamber is heated up

for 7 minutes. After that time, the display indicates blinking value, which should be changed according to the current temperature in the moisture analyzer.
Finish the whole calibration process by pressing **Print/Enter.**



Caution: Only for moisture analyzers with drying temperature of 250 °C.

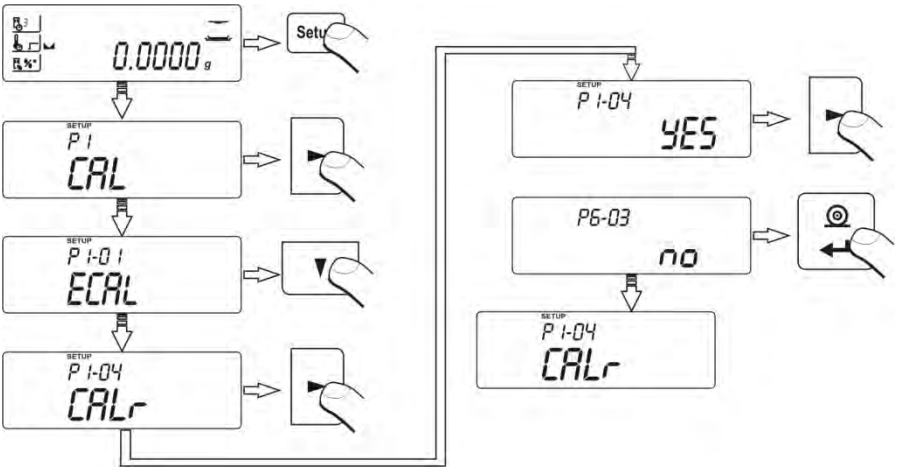
Display indicates current temperature of the moisture analyzer. After 7 minutes, the display shows (blinking)
value of the temperature. Set the value corresponding to the current temperature of the moisture analyzer.
Press **Print/Enter,** to start the next phase of calibration. The moisture analyzer activates halogen lamp and heats up the drying chamber for 7 minutes, showing the current temperature. After 7 minutes, the display shows (blinking)

value of the temperature. Set the value corresponding to the current temperature of the moisture analyzer. Press **Print/Enter,** to start the next phase of calibration. After following 7 minutes, the display shows (blinking) value of the temperature. After entering the temperature value, proceed with the last phase of calibration process, by pressing the button **Print/Enter.** Within the last 7 minutes**,** the drying chamber is heated up again, and upon the completion of this process, the display indicates (blinking)
value of the temperature, which should be changed according to the current temperature of the moisture analyzer. After entering the temperature value, finish the whole calibration process by pressing **Print/Enter.**

Return to weighing
(according to procedure in 8.2 – return to weighing function).

10.4. Calibration report printout

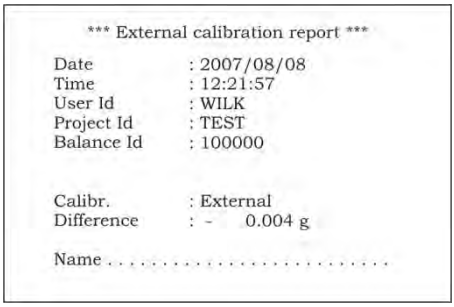
After each calibration report can be printed. The report is printed on external printer or sent to computer and recorded in the file to archiving.



YES - report will be printed.
no - report will not be printed

Remember that after setting parameter to value **YES**, report will be generated and sent automatically.
Contents of calibration report depends on balance settings in **GLP** submenu. All options which have YES attributes, will be printed.

Exemplary printout if calibration report:


*** External calibration report ***

Date : 2007/08/08
Time : 12:21:57
User Id : WILK
Project Id : TEST
Balance Id : 100000

Calibr. : External
Difference : - 0.004 g

Name . . . . . .

11. PRINTOUTS FOR GLP PROCEDURES

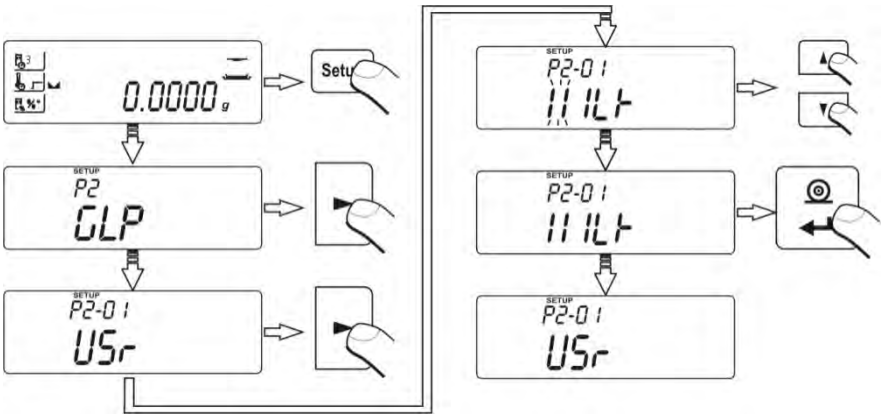
P2 GLP is the group of parameters enabling to declare variables, which are on calibration printout and measurements printout.

P2 GLP

P2.1	USr	|	
P2.2	PrJ	|	
P2.3	Ptin	|	YES
P2.4	PdAt	|	YES
P2.5	PUSr	|	YES
P2.6	PPrJ	|	YES
P2.7	PId	|	YES
P2.8	PFr	|	YES

- **P2-01 USr**

Option enables to introduce user name. User has possibility to introduce name of max 6 alphanumeric signs. Name can be introduced by mans of moisture analyzer keyboard or by navigation keys **Up**, **Down**, **Left**, **Right**.



Available signs and their equivalents displayed by moisture analyzer are shown below:

-	0	1	2	3	4	5	6	7	8	9
_	0	1	2	3	4	5	6	7	8	9

A	b	C	d	E	F	G	H	I	J	K	L	M
A	B	C	D	E	F	G	H	I	J	K	L	M

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

a	b	c	d	e	f	g	h	i	j	k	l	m
a	b	c	d	e	f	g	h	i	j	k	l	M

n	o	P	q	r	s	t	u	v	w	x	y	z
n	o	P	q	r	s	t	u	v	w	x	y	z

Exemplary user name introduced in capital letters:

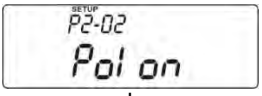
Exemplary user name introduced in small letters:

- **P2-02 Prj**

Option enabling to introduce project name (e.g. relating to specific test). Exemplary project name introduced in capital letters:

POLON

Exemplary project name introduced in small letters:



polon

- **P2-03 Ptin**

Option enabling to print measurement time

- **P2-04 PdAt**

Option enabling to print date of measurement

- **P2-05 PUSr**

Option enabling to print user name

- **P2-06 PPrj**

Option enabling to print project name

- **P2-7 Pld**

Option enabling to print factory number

- **P2-08 PFr**

Option enabling to print frames on printout

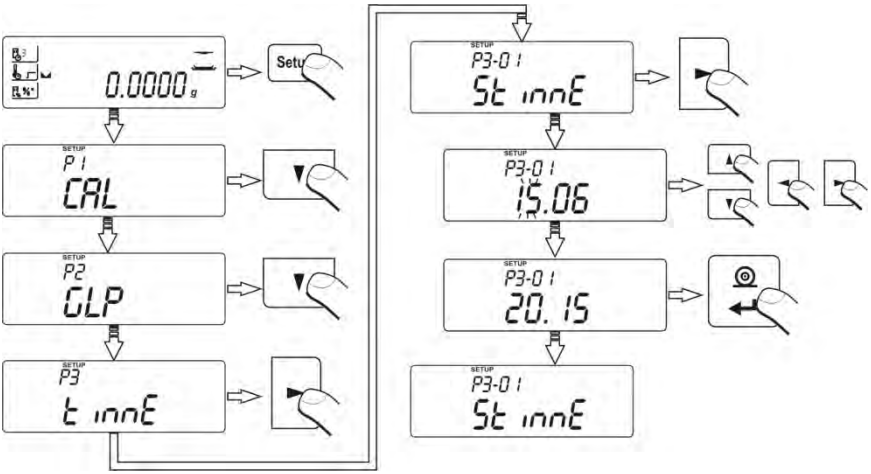
For above described parameters choose values:

no - not to print during report,
YES - print during report

Return to weighing
(according to procedure in 8.2 –return to weighing function).

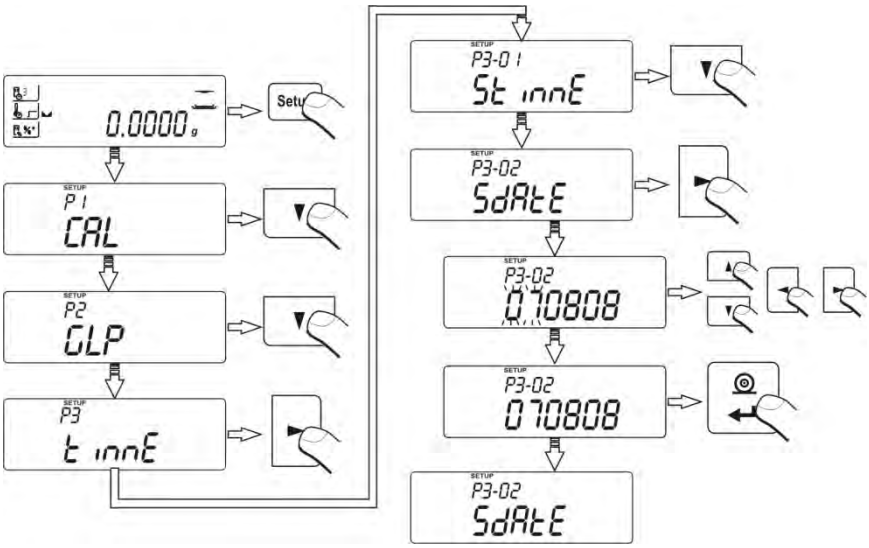
12. SETTING TIME AND DATE

12.1. Time setting



Parameter enabling to set time of moisture analyzer – to change settings use navigation keys **Up**, **Down**, **Left**, **Right**.

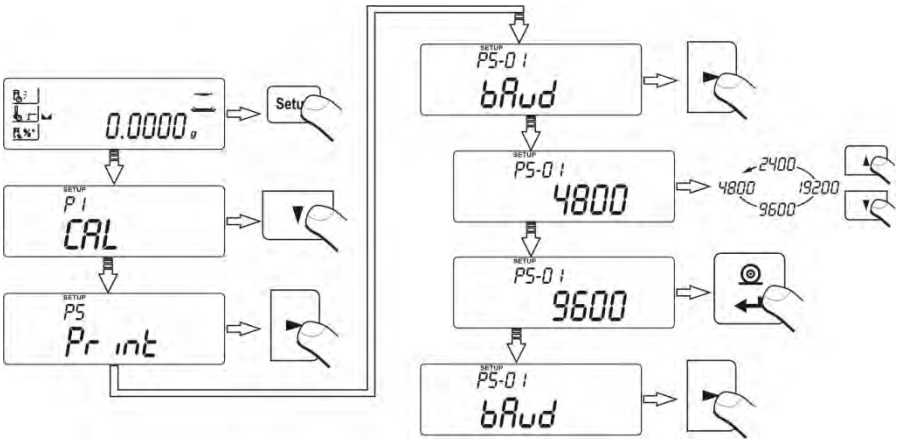
12.2. Date setting



Parameter enabling to set date of moisture analyzer – to change settings use navigation keys **Up**, **Down**, **Left**, **Right**.

13. FUNCTIONS CONNECTED WITH USE OF RS 232

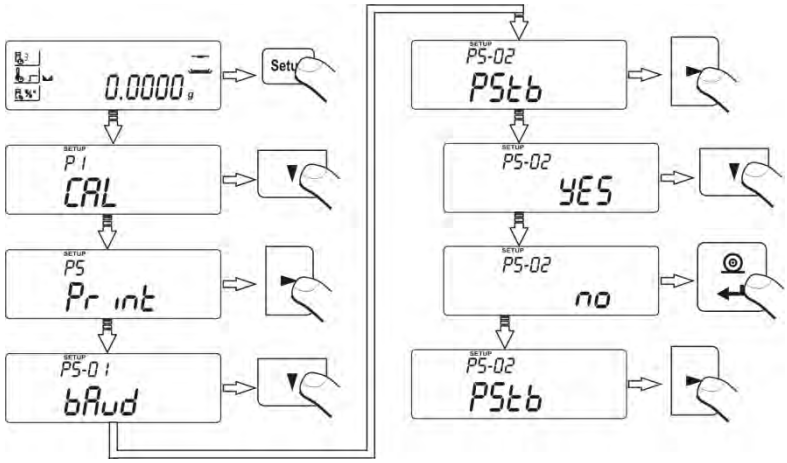
13.1. Choice of transmission speed



To choose required speed value:
- 2400 bit/s
- 4800 bit/s
- 9600 bit/s
- 19200 bit/s.

Return to weighing
(according to procedure in 8.2 –return to weighing function).

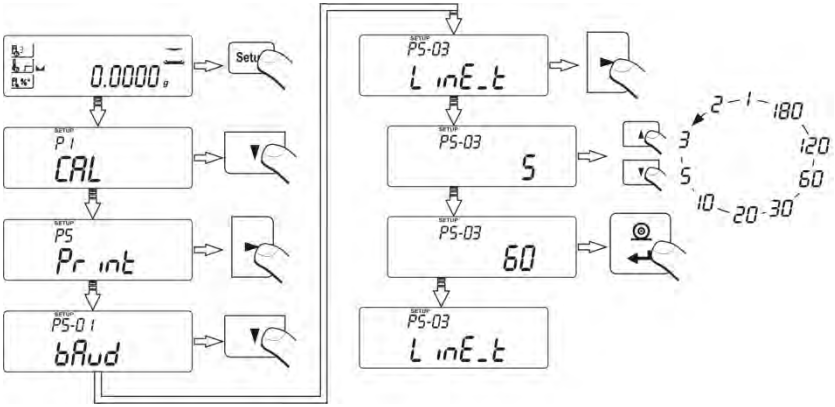
13.2. Determination of data type sent through RS 232



YES - sending stable weighing result,
no - sending stable or temporary weighing result.

Return to weighing
(according to procedure in 8.2 –return to weighing function).

13.3. Printout time



Printout time determines how often information about drying process will be sent through RS 232. Possible settings: **1**, **2**, **3**, **5**, **10**, **20**, **30**, **60**, **120**, **180** seconds.

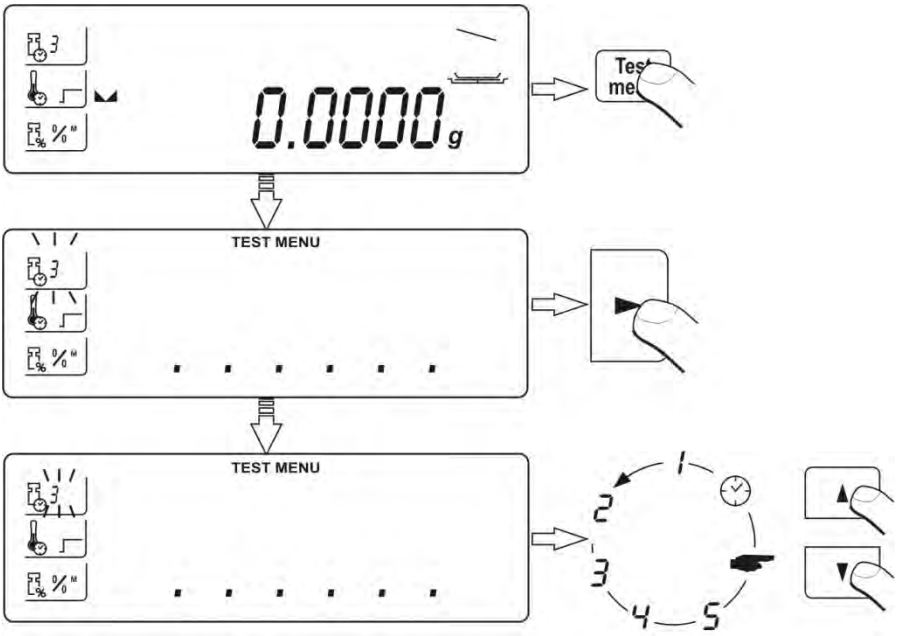
14. DRYING PROCESS WITH USE OF SHORTENED MENU

In menu drying procedures following procedures should be set:
- way of drying process finish,
- profile according to which drying process is carried out,
- type of displayed result.

To start drying process with use of shortened menu, switch off access to programs library– **P6-01 Libr**.

To change parameters settings, enter to drying menu with key **Test menu**. Group marker **way of drying process finish** will start flashing. Next using navigation key **Right**, start settings of parameters group. With navigation keys **Up** and **Down**, set one of options and accept changes (pressing twice key **Print/Enter**) or continue setting the parameters (pressing once key **Print/Enter**).

14.1. Way of drying process finish

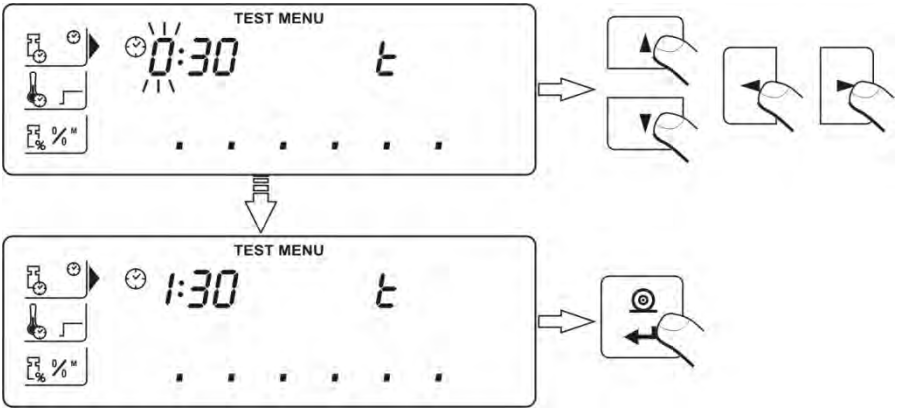


Parameter **way of drying process finish** has values:

1 – automatic finish (change of mass 1mg / in time range 10s)
2 - automatic finish (change of mass 1mg / in time range 25s)
3 - automatic finish (change of mass 1mg / in time range 60s)
4 - automatic finish (change of mass 1mg / in time range 90s)
5 - automatic finish (change of mass 1mg / in time range 120s)

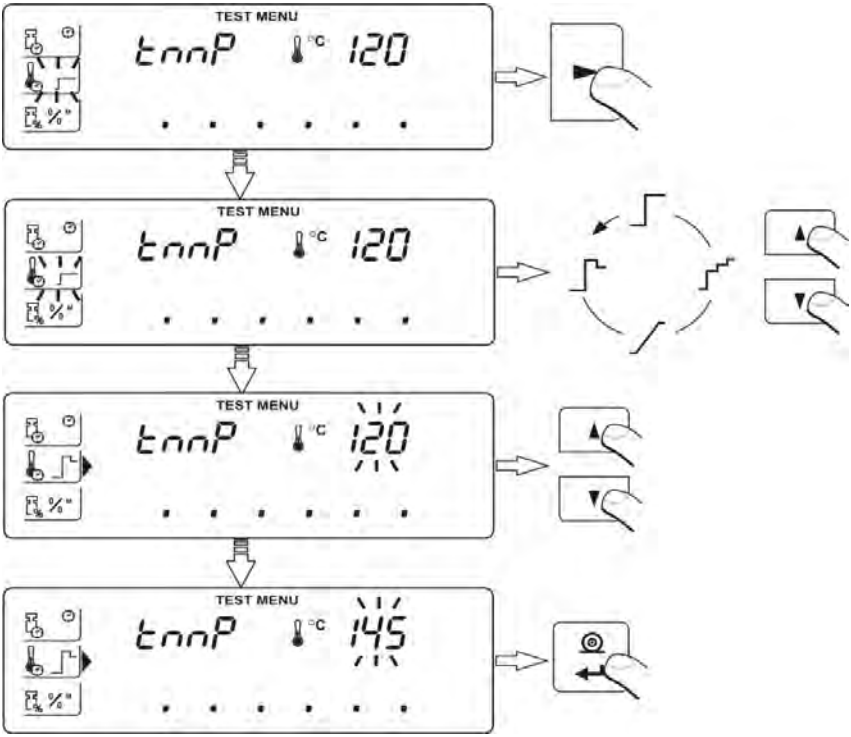
- manual finish (after pressing key **Start/Stop**)

- time finish (max time 9 hours 59 minutes):



To accept changes press three times key **Print/Enter**.

14.2. Profile according to which drying process is carried out



To accept changes press three times key **Print/Enter**.

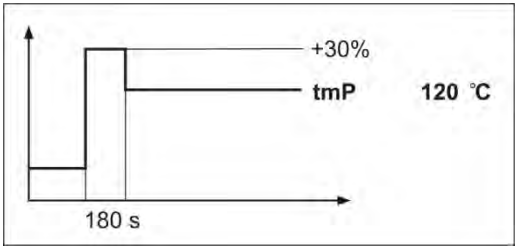
Parameter **profile according to which drying process is carried out** has values:

- **STANDARD** drying profile

In standard profile, set temperature **tmP** in which sample will be tested,

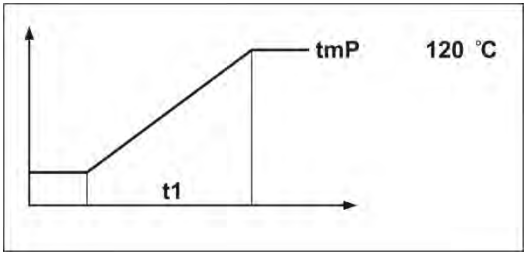
- **QUICK** drying profile

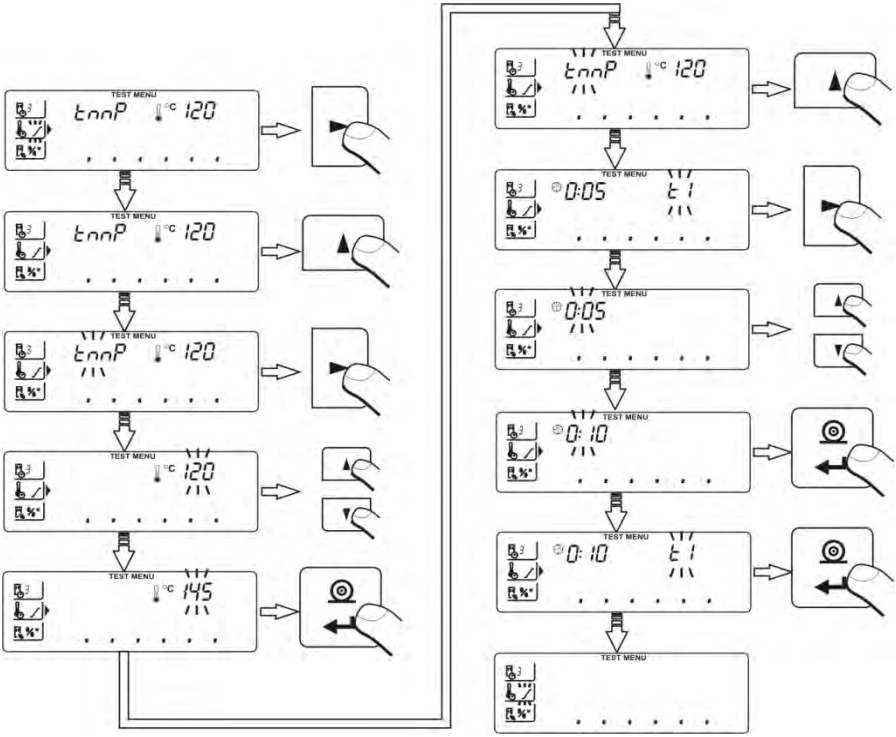
In quick profile, set temperature **tmP** in which sample will be tested,
This profile is characterised by quick increase of temperature in relatively short period of time. Drying temperature is increased of 30% in time of 180 seconds, after which temperature decreases to temperature set in profile settings.



- **MILD** drying profile

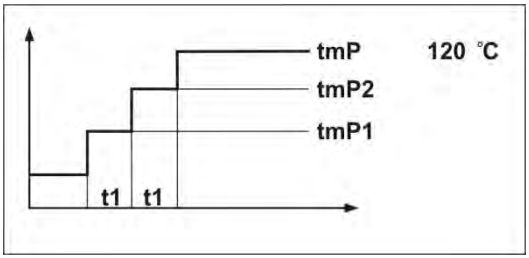
In mild profile, set temperature **tmP** in which sample will be tested and time **t1** in which moisture analyzer should reach this temperature.

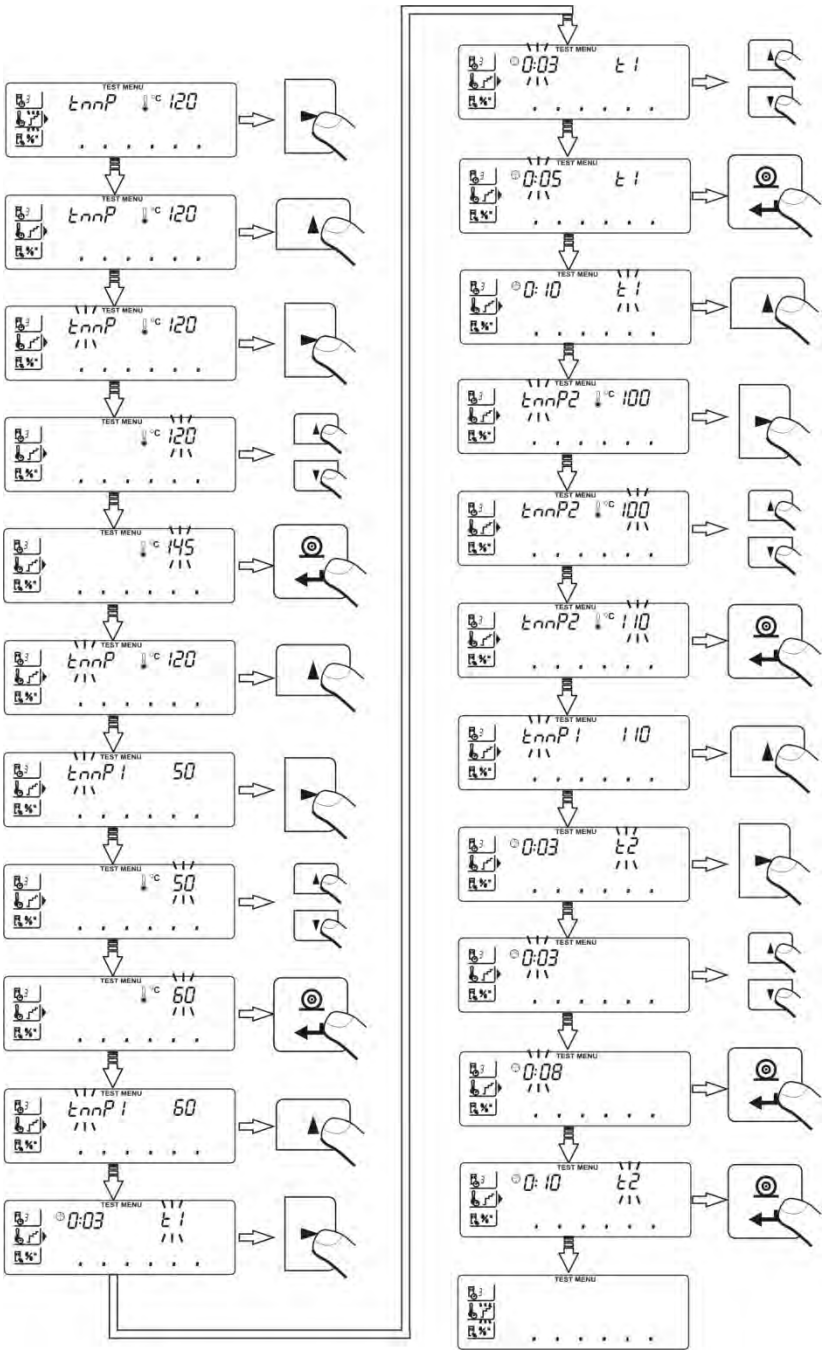




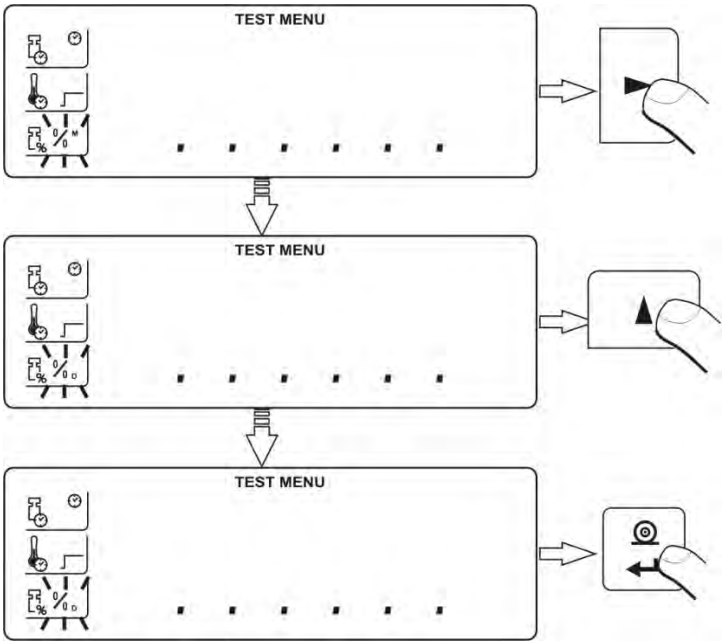
- **STEP** drying profile

In step profile, set temperature **tmP** in which tested sample should be, step temperatures **tmP1** and **tmP2** and time between step temperatures **t1** and **t2**.




TEST MENU
tnnP 120
tnnP 120
tnnP 120
120
145
tnnP 120
tnnP1 50
50
60
tnnP1 60
0:03 t1
0:05 t1
0:10 t1
tnnP2 100
tnnP2 100
tnnP2 110
tnnP1 110
0:03 t2
0:03
0:08
0:10 t2

14.3. Type of displayed result



To accept changes, press twice key **Print/Enter**.

- percentage weight loss

$\%_0$ M

displays change of mass registered during drying process in percents,

- part of dry mass received in drying process in percents,

$\%_0$ D

part of sample which remained on the pan, after humid evaporation is the result,

- humid / dry mass ratio received in drying process in percents

$\%_0$ R

part of sample which vaporized during drying process is the result,

- mass change

g

mass of change registered during drying process is the result.

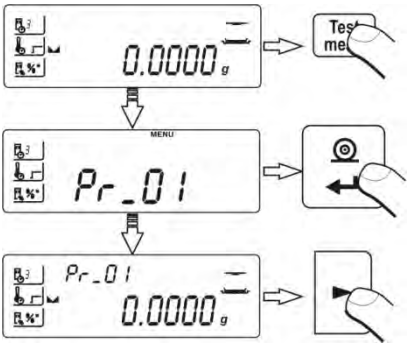
15. DRYING PROCESS WITH USE OF PROGRAM PROCEDURES LIBRARIES

To start drying process with use of program libraries, switch on access to programs libraries **P6-01 Libr**. Moisture analyzer has 20 libraries, which can be freely configured, saved and use by entering specific library.

To change parameters settings, enter to drying menu with key **Test menu**. Group marker **way of drying process finish** will start flashing. Next using navigation key **Right**, start settings of parameters group. With navigation keys **Up** and **Down**, set one of options and accept changes (pressing twice key **Print/Enter**) or continue setting the parameters (pressing once key **Print/Enter**).

To change parameters of drying from particular libraries, follow the procedures from **point 14 DRYING PROCESS WITH USE OF SHORTENED MENU**

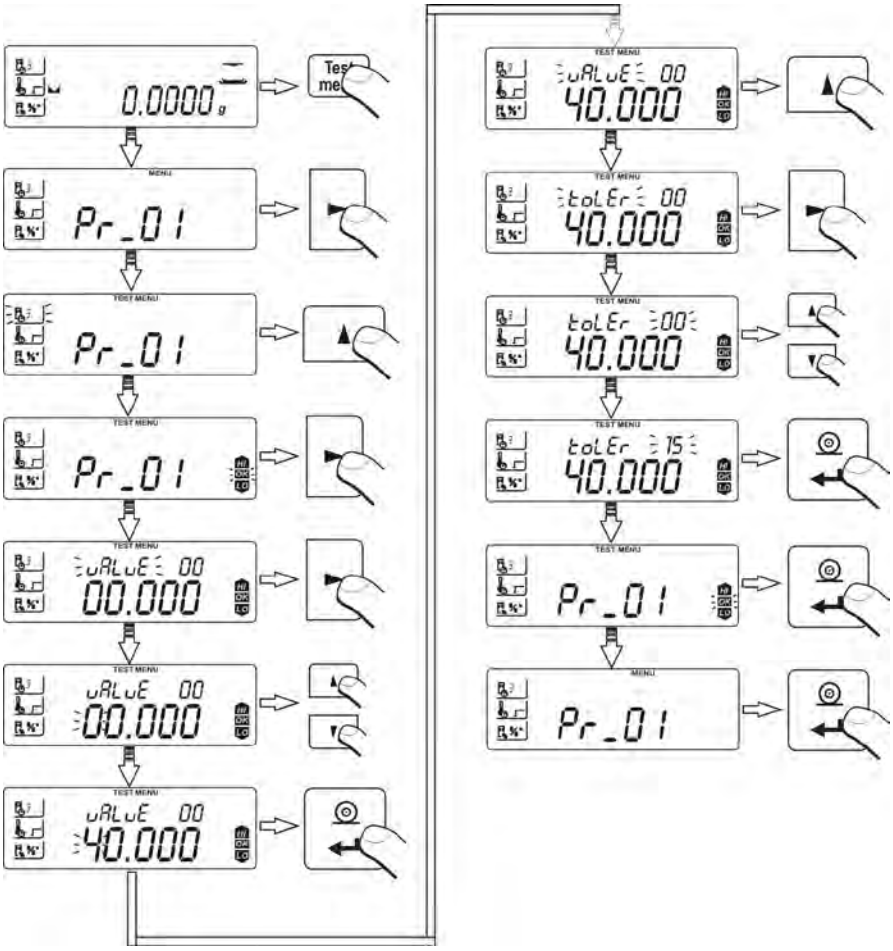
To use specific library in drying process:



To exit from mode of use from program libraries, switch off access to libraries according to point **pkt. 10.3**.

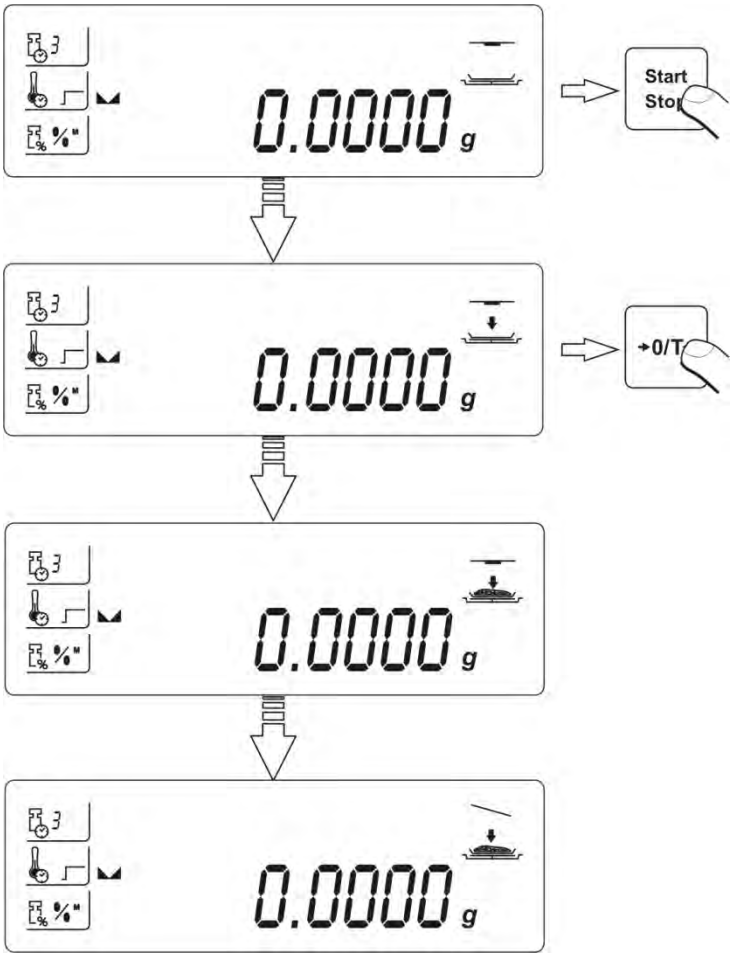
15.1. Control of the sample mass

Control of the sample mass is active only when access to program libraries P6-01 Libr (set the parameter to YES) is switched on.
The parameters of this function: values and tolerances are configured in the following way:

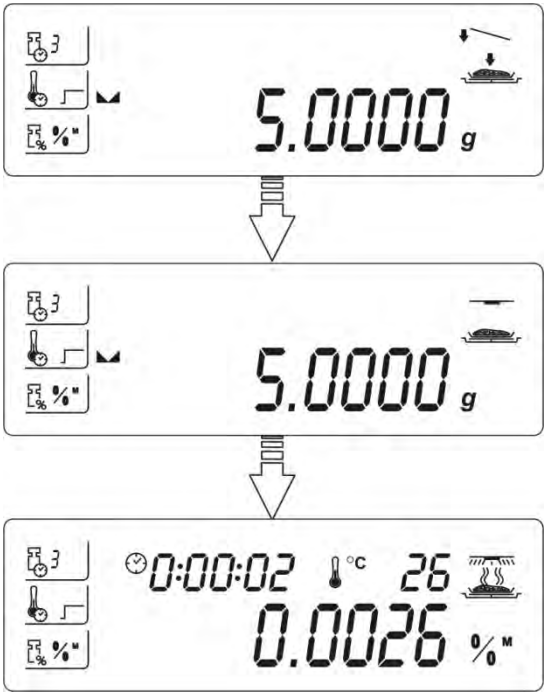


16. DRYING PROCESS

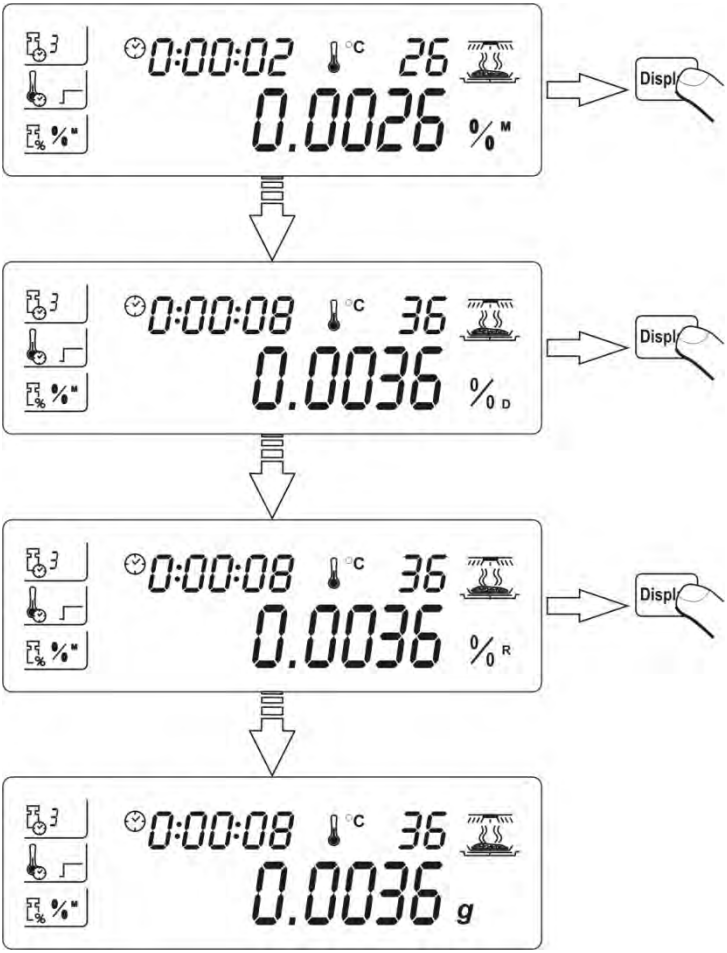
To start drying process:



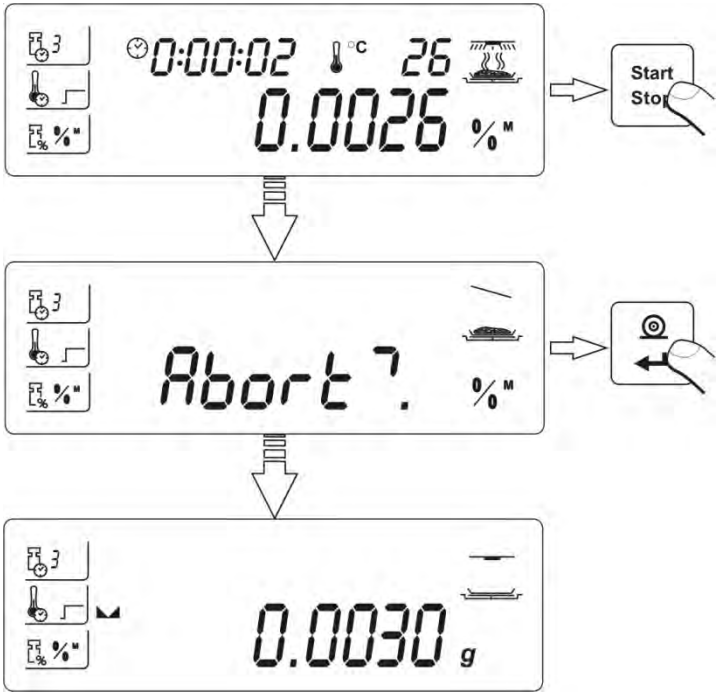
start drying procedures by pressing key **Start/Stop** and next, after unloading the pan, press key **TARA**. Open drying chamber, place tested sample on pan of moisture analyzer and close drying chamber.



To change during process displayed data press key **Display**.



To stop drying process, press key **Start/Stop** and confirm with key **Print/Enter**. The exception is way of manual drying process finish – after pressing key **Start/Stop** – moisture analyzer will finish drying process without option of confirmation with key **Print/Enter**.



17. LIST OF COMMUNICATIONS COMPUTER -BALANCE

Function **RESET INTERFACE**
Command **R CR LF** (zero current made commands and return to factory setting)

Function **SEND ALL COMMANDS FROM THE INSTRUMENT**
Command **PC CR LF** (sends information about all commands in the program from the instrument)

Function **SEND THE RESULT IN BASIC UNIT**
Command **S CR LF** (sends result in basic unit after stability from the instrument)

Function **SEND THE RESULT IN BASIC UNIT IMMEDIATELY**
Command **SI CR LF** (sends result in basic unit from the instrument)

Function **SEND THE RESULT IN CURRENTLY USED UNIT**
Command **SU CR LF** (sends the result in current used result after stability)

Function	**SEND THE RESULT IN CURRENTLY USED UNIT IMMEDIATELY**
Command	**SUI CR LF** (sends the result in current used unit from the instrument)
Function	**SET THE MOISTURE ANALYZER TO ZERO**
Command	**Z CR LF** (set to zero the instrument after stability)
Function	**TARE IF IT IS STABLE**
Command	**T CR LF** (set to zero the moisture analyzer after stability)
Function	**SWITCH ON CONTINUOUS TRANSMISSION IN BASIC UNIT**
Command	**C0 CR LF** (break continuous transmission in basic unit)
Function	**SWITCH ON CONTINUOUS TRANSMISSION IN BASIC UNIT**
Command	**C1 CR LF** (start continuous transmission in basic unit)
Function	**SWITCH ON CONTINUOUS TRANSMISSION IN ACTUAL UNIT**
Command	**CU0 CR LF** (break continuous transmission in actual unit)
Function	**SWITCH ON CONTINUOUS TRANSMISSION IN ACTUAL UNIT**
Command	**CU1 CR LF** (start continuous transmission in actual unit)
Function	**GIVE THE NUMBER OF THE INSTRUMENT**
Command	**NB CR LF** (send factory number)
Function	**GIVE THE RANGE OF WEIGHING**
Command	**FS CR LF** (send value of max capacity in basic unit by the instrument)
Function	**GIVE THE VERSION OF THE SOFTWARE**
Command	**RV CR LF** (sends name of the program)
Function	**DISPLAY SETUP**
Command	**PS CR LF** (sends all setup – printout of the parameters)
Function	**MAKE INTERNAL CALIBRATION**
Command	**CL CR LF** (starts internal calibration)

Notice!

*Sending command to the instrument which is not in the list or has an error and it is finished with CR LF, back sending the command in form. If there is no command in the list or has an error and it is finished the command is returned in **E S CR LF.***
Spaces should be omitted.

18. Error detection

If moisture balance software detects an error a proper error message appears on the graphic display. The error message contains number of error which informs about reasons of it.

Error message	Description
Er1 Hi	Start mass exceeds admissible range (it refers to start and calibration – start mass)
Er2 nu	Range of converter exceeded from down limit
Er3 Fu	Range of converter exceeded from upper limit
Er4 ro	Value of mass or temperature exceeds admissible range (it refers to mass calibration or temperature – mass or final temperature)
Er5 Ad	Converter A/C error
Er6 to	Time of operation exceeded (tare or print because stability is not achieved in proper time)
Er7 ou	Inputted value above the range (it can refer to setting reference mass or date)
Error 1.3 AD Th L	Number of A/D divisions from the thermometer in the drying chamber = 0 temperature sensor defected, heating process of the drying chamber will not be initiated, return to weighing mode by pressing ESC key
Error 1.3 AD Th H	Number of A/D divisions from the thermometer in the drying chamber = 1024 temperature sensor defected, heating process of the drying chamber will not be initiated, return to weighing mode by pressing ESC key.
Error 1.3 AD Tc L	Number of A/D divisions from the thermometer of the solenoid actuator = 0 temperature sensor defected, return to weighing mode by pressing ESC key.
Error 1.3 AD Tc H	Number of A/D divisions from the thermometer of the solenoid actuator = 0 temperature sensor defected, return to weighing mode by pressing ESC key.

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